EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	472	(73/865.9 or 73/866.5 or 73/493 or 73/494 or 384/448).ccls.	US-PGPUB	OR	ON	2006/06/23 12:12
L2	132	(73/865.9 or 73/866.5 or 73/493 or 73/494 or 384/448).ccls.	EPO	OR	ON	2006/06/23 12:20
L3	523	(73/865.9 or 73/866.5 or 73/493 or 73/494 or 384/448).ccls.	JPO	OR	ON	2006/06/23 12:45
L4	2438	(73/865.9 or 73/866.5 or 73/493 or 73/494 or 384/448).ccls.	USPAT	OR	ON	2006/06/23 13:29
L5	277	4 and (cap or capped or capping)	USPAT	OR	ON	2006/06/23 12:47
L6	47	(73/865.9 or 73/866.5 or 73/493 or 73/494 or 384/448).ccls. and (cap or capped or capping)	USOCR	OR	ON	2006/06/23 13:20
L7	0	(ring or race) and (cap or capped or capping) and bearing and (coder or encoder or encoding or coding or code or encode or coded or encoded) and (sensor or sensing or transducer or transducing)	IBM_TDB	OR	ON	2006/06/23 13:33
L8	2632	(ring or race) and (cap or capped or capping) and bearing and (coder or encoder or encoding or coding or code or encode or coded or encoded) and (sensor or sensing or transducer or transducing)	US-PGPUB	OR	ON	2006/06/23 13:50
L9	1	(ring or race) and (cap or capped or capping) and bearing and (coder or encoder or encoding or coding or code or encode or coded or encoded) and (sensor or sensing or transducer or transducing)	EPO	OR	ON	2006/06/23 13:34
L10	4	(ring or race) and (cap or capped or capping) and bearing and (coder or encoder or encoding or coding or code or encode or coded or encoded) and (sensor or sensing or transducer or transducing)	JPO	OR	ON	2006/06/23 13:36
L11	7	(ring or race) and (cap or capped or capping) and bearing and (coder or encoder or encoding or coding or code or encode or coded or encoded) and (sensor or sensing or transducer or transducing)	DERWENT	OR	ON	2006/06/23 13:41
L12	1	2004-181978.NRAN.	DERWENT	OR	ON	2006/06/23 13:38

EAST Search History

L13	272	(ring or race) and (cap or capped or capping) and bearing and (coder or encoder or encoding or coding or code or encode or coded or encoded) and (sensor or sensing or transducer or transducing)	USOCR	OR	ON	2006/06/23 13:49
L14	2610	(ring or race) and (cap or capped or capping) and bearing and (coder or encoder or encoding or coding or code or encode or coded or encoded) and (sensor or sensing or transducer or transducing)	USPAT	OR	ON	2006/06/23 13:41
L15	5	((ring or race) with (cap or capped or capping) with bearing with (coder or encoder or encoding or coding or code or encode or coded or encoded)) same ((sensor or sensing or transducer or transducing) with (cap or capped or capping))	US-PGPUB	OR	ON	2006/06/23 13:47
L16	0	((ring or race) with (cap or capped or capping) with bearing with (coder or encoder or encoding or coding or code or encode or coded or encoded)) and ((sensor or sensing or transducer or transducing) with (cap or capped or capping))	USOCR	OR	ON	2006/06/23 13:47
L17	2	((ring or race) with (cap or capped or capping) with bearing with (coder or encoder or encoding or coding or code or encode or coded or encoded)) same ((sensor or sensing or transducer or transducing) with (cap or capped or capping))	USPAT	OR	ON	2006/06/23 13:47
L18	0	13 and (73/865.9 or 73/866.5 or 73/493 or 73/494 or 384/448).ccls.	USOCR	OR	ON	2006/06/23 13:50
L19	21	8 and ((73/865.9 or 73/866.5 or 73/493 or 73/494 or 384/448).ccls. or (g01m013/04 or f16c041/00 or f16c041/04 or f16c032/00 or g01d011/24 or g01p001/02 or g01p003/44 or h01r013/66).ipc.)	US-PGPUB	OR	ON	2006/06/23 14:00
L20	26	14 and ((73/865.9 or 73/866.5 or 73/493 or 73/494 or 384/448).ccls. or (g01m013/04 or f16c041/00 or f16c041/04 or f16c032/00 or g01d011/24 or g01p001/02 or g01p003/44 or h01r013/66).ipc.)	USPAT	OR	ON	2006/06/23 14:01
L21	1	"5756894".pn.	USPAT	OR	ON	2006/06/23 14:10
L22	1	"5938346".pn.	USPAT	OR	ON	2006/06/23 14:12
L23	1	jp-2000221203-$.did.	DERWENT	OR	ON	2006/06/23 14:13

EAST Search History

L24	1	(EP-401464-$ or JP-04004313-$ or JP-02225823-$).did.	DERWENT	OR	ON	2006/06/23 14:15

Office européen des brevets

RAPPORT DE RECHERCHE EUROPEENNE

Numéro de la demande
EP 03 29 1850

DOCUMENTS CONSIDERES COMME PERTINENTS

Catégorie	Citation du document avec indication, en cas de besoin, des parties pertinentes	Revendication concernée	CLASSEMENT DE LA DEMANDE (Int.Cl.7)
X	EP 1 178 319 A (DELPHI TECH INC) 6 février 2002 (2002-02-06) * alinéas [0014]-[0020]; figures 1-3 *	1-22	G01P1/02 G01P3/44 H01R13/66 G01D11/24
X,D	DE 199 30 139 A (CONTINENTAL TEVES INC) 13 janvier 2000 (2000-01-13) * colonne 2, ligne 35 - colonne 3, ligne 4 * * colonne 4, ligne 6 - ligne 14; figures 1-3 *	1-5,10, 12-14, 19-22	
X	US 5 938 346 A (OUCHI HIDEO) 17 août 1999 (1999-08-17) * colonne 4, ligne 65 - colonne 6, ligne 27; figures 1-6 *	1,12,19, 22	
A	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 11, 3 janvier 2001 (2001-01-03) -& JP 2000 221203 A (KOYO SEIKO CO LTD), 11 août 2000 (2000-08-11) * abrégé; figures 3-6 *	6-11	DOMAINES TECHNIQUES RECHERCHES (Int.Cl.7) G01P H01R
A,D	EP 0 743 526 A (SKF IND SPA) 20 novembre 1996 (1996-11-20) * colonne 3, ligne 12 - ligne 45 *	1-24	G01D

Le présent rapport a été établi pour toutes les revendications

Lieu de la recherche	Date d'achèvement de la recherche	Examinateur
LA HAYE	5 décembre 2003	Pflugfelder, G

CATEGORIE DES DOCUMENTS CITES

X : particulièrement pertinent à lui seul
Y : particulièrement pertinent en combinaison avec un autre document de la même catégorie
A : arrière-plan technologique
O : divulgation non-écrite
P : document intercalaire

T : théorie ou principe à la base de l'invention
E : document de brevet antérieur, mais publié à la date de dépôt ou après cette date
D : cité dans la demande
L : cité pour d'autres raisons

& : membre de la même famille, document correspondant

EPO FORM 1503 03.82 (P04C02)

ANNEXE AU RAPPORT DE RECHERCHE EUROPEENNE RELATIF A LA DEMANDE DE BREVET EUROPEEN NO. EP 03 29 1850

La présente annexe indique les membres de la famille de brevets relatifs aux documents brevets cités dans le rapport de recherche européenne visé ci-dessus.
Lesdits membres sont contenus au fichier informatique de l'Office européen des brevets à la date du
Les renseignements fournis sont donnés à titre indicatif et n'engagent pas la responsabilité de l'Office européen des brevets.

05-12-2003

Document brevet cité au rapport de recherche	Date de publication	Membre(s) de la famille de brevet(s)	Date de publication
EP 1178319 A	06-02-2002	US 2002095989 A1	25-07-2002
		EP 1178319 A1	06-02-2002
DE 19930139 A	13-01-2000	DE 19930139 A1	13-01-2000
		JP 2000081444 A	21-03-2000
		US 6203204 B1	20-03-2001
US 5938346 A	17-08-1999	JP 9251028 A	22-09-1997
		GB 2309085 A ,B	16-07-1997
JP 2000221203 A	11-08-2000	AUCUN	
EP 0743526 A	20-11-1996	IT T0950119 U1	19-11-1996
		EP 0743526 A1	20-11-1996
		US 5756894 A	26-05-1998

EPO FORM P0460

Pour tout renseignement concernant cette annexe : voir Journal Officiel de l'Office européen des brevets, No.12/82

DERWENT-ACC-NO: 2000-568110

DERWENT-WEEK: 200053

TITLE: Wheel speed detector for antilock braking system, has clamp extending from cyclic support, which holds sensor in contact with cyclic board

PATENT-ASSIGNEE: KOYO SEIKO CO LTD[KOYS]

PRIORITY-DATA: 1999JP-0024768 (February 2, 1999)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 2000221203 A	August 11, 2000	N/A	008	G01P 003/487

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP2000221203A	N/A	1999JP-0024768	February 2, 1999

INT-CL (IPC): B60T008/00, F16B005/10 , F16C019/00 , F16C019/52 , F16C033/78 , F16C041/00 , F16J015/32 , G01P003/487

ABSTRACTED-PUB-NO: JP2000221203A

BASIC-ABSTRACT:

NOVELTY - A sensor (20) is attached through cyclic support (40) in isolation
from pulser ring axially. The gap between the stationary and rotary segments
is sealed by the cyclic board in the cyclic support. A clamp (46) protruding
from the support, extends axially along opening. The sensor is supported by
both board and clamp.

USE - For antilock braking system of motor vehicles.

ADVANTAGE - Simplifies attachment/detachment of sensor, by providing flexible
support and clamp. Facilitates moving sensor and ring reliably as sensor is
attached with the cyclic support.

DESCRIPTION OF DRAWING(S) - The figure shows the exploded perspective view of
wheel speed detector.

Sensor 20

Support 40

Clamp 46

CHOSEN-DRAWING: Dwg.1/8

DERWENT-CLASS: Q18 Q61 Q62 Q65 S02

EPI-CODES: S02-G01B1;

PGPUB-DOCUMENT-NUMBER: 20060039639

PGPUB-FILING-TYPE:

DOCUMENT-IDENTIFIER: US 20060039639 A1

TITLE: Bearing device with sensor and rolling bearing with sensor

PUBLICATION-DATE: February 23, 2006

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Aoki; Mamoru	Kanagawa		JP
Sakatani; Ikunori	Kanagawa		JP
Watanabe; Masamitsu	Kanagawa		JP

APPL-NO: 10/532985

DATE FILED: October 24, 2003

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	DOC-ID	APPL-DATE
JP	202-312772	2002JP-202-312772	October 28, 2002
JP	2002-362635	2002JP-2002-362635	December 13, 2002
JP	2003-001159	2003JP-2003-001159	January 7, 2003
JP	2003-004493	2003JP-2003-	

004493 January 10, 2003
JP 2003-303736 2003JP-2003-303736 August 27, 2003

PCT-DATA:
APPL-NO: PCT/JP03/13649
DATE-FILED: Oct 24, 2003
PUB-NO:
PUB-DATE:
371-DATE: Apr 28, 2005

INT-CL-PUBLISHED:
TYPE IPC DATE IPC-OLD
IPCP F16C41/04 20060101 F16C041/04

INT-CL-CURRENT:
TYPE IPC DATE
CIPP F16C41/04 20060101

US-CL-PUBLISHED: 384/448

US-CL-CURRENT: **384/448**

ABSTRACT:

The present invention relates to a bearing apparatus with a sensor and a rolling bearing with a sensor used to movers such as automobiles or railway carriers, facility machines of equipment, or machine tools. One of the embodiments comprises a sensor detecting conditions of the rolling bearing, a ring-shaped sensor cover housing the sensor therein and secured to a stationary-side bearing ring, and a ring shaped

presser member secured to a
bearing housing provided outside in a radius
direction of the sensor cover, or
secured to a shaft, and an opening portion is
provided at a decided portion of
the sensor cover, and projections standing toward a
side of the presser member
are furnished in the circumference of the opening
portion, the presser member
is defined with cutouts for inserting the
projections, and the cutouts are
arranged with the projections.

CLAIMS:

1-21. (canceled)

22. A bearing apparatus with a sensor, furnished
with a rolling bearing
including in that a plurality of rolling elements
are incorporated between a
rotary-side bearing ring and a stationary-side
bearing ring, a sensor enabling
to detect conditions of the rolling bearing, a ring
shaped sensor cover housing
the sensor inward and secured to the stationary-
side bearing ring, and a ring
shaped presser member secured to a bearing housing
or a shaft provided outside
in a radius direction of the sensor cover, wherein
an opening is defined in a
determined position of the sensor cover, and is
provided at its peripheral part
with projections standing toward the side of the
presser member, the presser
member is formed with a cutout into which the

projections are inserted for restraining rotation of the sensor cover.

23. The bearing apparatus with a sensor as set forth in claim 22, wherein a signal wire to be connected to the sensor is inserted in the opening.

24. The bearing apparatus with a sensor as set forth in claim 22, wherein the projections are made by being bent to project a slash formed in one part of the sensor cover in a diametrical direction.

25. In a rolling bearing structured in that a plurality of rolling elements held in a holder are rotatably incorporated between a pair of bearing rings, a bearing apparatus with a sensor, comprising a sensor for detecting conditions of a supported rotating shaft or of the rolling bearing, a ring shaped sensor cover secured to one end face in an axial direction of a stationary-side bearing ring, and a ring shaped sensor holding member secured to the sensor cover, wherein the sensor is fitted in a sensor holding groove provided in a determined position along a circumferential direction in the sensor holding member with a determined tightening margin owing to elastic deformation of the sensor holding member.

26. The bearing apparatus with a sensor as set forth in claim 25, wherein the sensor holding member is fitted inward of the

sensor cover with a determined space.

27. The bearing apparatus with a sensor as set forth in claim 25, wherein the sensor holding member is formed with a plurality of positioning pins as projecting respectively in the axial direction, leaving determined spaces in the circumferential direction, and the sensor cover is formed with a plurality of fitting holes in respective positions corresponding to the plurality of positioning pins, and the plurality of positioning pins are fitted in the plurality of respectively corresponding fitting holes, whereby the sensor cover and the sensor holding member are positioned.

28. The bearing apparatus with a sensor as set forth in claim 27, wherein the plurality of positioning pins are respectively inserted in the plurality of fitting holes, and the plurality of positioning pins passing through the plurality of fitting holes are plastic-deformed at front ends, whereby the sensor cover and the sensor holding member are fixed.

29. The bearing apparatus with a sensor as set forth in claim 27, wherein the plurality of fitting holes are formed in the circumference with projections standing toward the sensor holding member, and the sensor cover and the sensor holding member are engaged by means of the

projections only.

30. The bearing apparatus with a sensor as set forth in claim 27, wherein a circuit substrate of the sensor is held between the sensor cover and the sensor holding member, and the plurality of positioning pins of the sensor holding member pass through holes provided in the corresponding positions in the circuit substrate, and are inserted in the fitting holes.

31. In a rolling bearing structured in that a plurality of rolling elements held in a holder are rotatably incorporated between a pair of bearing rings, a bearing apparatus with a sensor, comprising a sensor for detecting conditions of a supported rotating shaft or of a bearing, a ring shaped sensor cover of a magnetic material secured to one end face in an axial direction of a stationary-side bearing ring, a ring shaped sensor holding member of a non-magnetic material holding the sensor inward under a condition of being secured inward of the sensor cover, and a conductive member installed as covering at least one part of the sensor holding member and has an electromagnetic shield effect.

32. In a rolling bearing structured in that a plurality of rolling elements held in a holder are rotatably incorporated between a pair of bearing rings, a

bearing apparatus with a sensor, comprising a sensor for detecting conditions of a supported rotating shaft or of a bearing, a ring shaped sensor cover of a conductive member having an electromagnetic shielding effect secured to one end face in an axial direction of a stationary-side bearing ring, and a ring shaped sensor holding member of a non-magnetic material holding the sensor inward under a condition of being secured inward of the sensor cover.

33. The bearing apparatus with a sensor or the rolling bearing with a sensor as set forth in claim 31, wherein the conductive member is provided as one body with the sensor holding member.

34. A rolling bearing with a sensor, comprising an inner ring, an outer ring, rolling elements interposed between the inner ring and the outer ring, a magnetic part to be detected provided to one of the inner ring and the outer ring, and a magnetically sensitive sensor provided to the other of the inner ring and the outer ring and being opposite to the magnetic part to be detected, wherein any one of the magnetic part to be detected and the magnetically sensitive sensor is secured to the inner ring or the outer ring via an attaching member of a magnetic substance.

35. The rolling bearing with a sensor asset forth in claim 34, wherein the

magnetic part to be detected is a ring shaped multi-pole magnet of rare earth.

36. The rolling bearing with a sensor as set forth in claim 34, wherein the attaching member is fixedly caulked in a concave groove formed in an outer diameter of the inner ring or the outer diameter of the outer ring.

37. The rolling bearing with a sensor as set forth in claim 36, wherein the concave groove is formed in the circumference along the outer diameter of the inner ring or the outer diameter of the outer ring, and the attaching members are caulked in a plurality of positions equidistantly along the circumference.

38. The rolling bearing with a sensor as set forth in claim 37, wherein the number of the caulking positions follows the under mentioned formula, (the number of the caulking positions)=nZ.+-.X herein, n: positive integer Z: the number of the rolling elements, and X: integer of 2 or more

39. The rolling bearing with a sensor as set forth in claim 38, wherein the number of the caulking positions is prime.

40. In a rolling bearing having at least an outer ring, an inner ring, and rolling elements, any one of the outer ring and the inner ring is a rotating ring, while the other is a stationary ring, a

rolling bearing with a sensor,
wherein an end face of a flat magnet is multi-pole magnet, and is secured to
the rotating ring, and a magnetically sensitive element is secured to the
stationary ring in opposition to the flat multi-pole magnetic face, leaving
spaces equidistantly in an axial direction of the bearing.

41. The rolling bearing with a sensor as set forth in claim 35, wherein the
member of attaching the magnet to the rotating ring extends toward the
stationary ring so as to close a vacancy of the bearing between the rotating
ring and the stationary ring.

42. The rolling bearing with a sensor as set forth in claim 41, wherein the
inner ring is the rotating ring, and the magnet attaching member is secured to
a step portion in the inner circumference of the inner ring.

43. The bearing apparatus with a sensor or the rolling bearing with a sensor
as set forth in claim 32, wherein the conductive member is provided as one body
with the sensor holding member.

44. The rolling bearing with a sensor as set forth in claim 40, wherein the
member of attaching the magnet to the rotating ring extends toward the
stationary ring so as to close a vacancy of the bearing between the rotating

ring and the stationary ring.

45. The rolling bearing with a sensor as set forth in claim 44, wherein the inner ring is the rotating ring, and the magnet attaching member is secured to a step portion in the inner circumference of the inner ring.

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PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050226545 A1

TITLE: Wheel bearing apparatus incorporated with a wheel
speed detecting apparatus

PUBLICATION-DATE: October 13, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Ohtsuki, Hisashi	Iwata-shi		JP
Shigeoka, Kazuhisa	Iwata-shi		JP
Ishikawa, Tomomi	Iwata-shi		JP

APPL-NO: 11/101351

DATE FILED: April 7, 2005

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	DOC-ID	APPL-DATE
JP	2004-115145	2004JP-2004-115145	April 9, 2004
JP	2004-115146	2004JP-2004-115146	April 9, 2004

INT-CL-PUBLISHED: [07] F16C041/04

INT-CL-CURRENT:

TYPE	IPC	DATE
CIPS	F16C41/04	20060101
CIPS	F16C41/00	20060101

US-CL-PUBLISHED: 384/448

US-CL-CURRENT: **384/448**

REFERENCE-FIGURES: 2

ABSTRACT:

A wheel bearing apparatus incorporating a wheel speed detecting apparatus has an outer member (4) with an integrally formed body mounting flange (4b) and double row outer raceway surfaces (4a) formed on the inner circumferential surface of the outer member (4). An inner member (3) includes a wheel hub (1) with an integrally formed wheel mounting flange (7) at one end. A cylindrical portion (1b) axially extends from the wheel mounting flange (7). An inner ring (6) is fitted on the cylindrical portion (1b) of the wheel hub (1). Double row inner raceway surfaces (1a, 6a) are formed on the outer circumferential surfaces of the wheel hub (1) and inner ring (6), respectively opposite to the double row outer raceway surfaces (4a). Double row rolling elements (5) are rotatably arranged between the outer and inner raceway surfaces (4a; 1a, 6a). An encoder (19) is mounted on the outer circumferential surface of the inner

ring (6). An annular sensor holder (15) is arranged on the end of the outer member (4) opposite to the encoder (19). A wheel speed detecting sensor (20) is integrally molded with the sensor holder (15) and arranged opposite to the encoder (19), via a predetermined radial gap. The encoder (19) has an annular ring configuration and its characteristics alternately and equidistantly vary along its circumferential direction. A seal is arranged at the inboard side of the encoder (19). The seal includes first and second annular sealing plates (21, 22) mounted on the sensor holder (15) and the inner ring (6), respectively, and opposite toward each other. The encoder (19) is mounted on the second sealing plate (22).

CLAIMS:

What is claimed is:

1. A wheel bearing apparatus incorporating a wheel speed detecting apparatus comprising: an outer member having an integrally formed body mounting flange and double row outer raceway surfaces formed on the inner circumferential surface of the outer member; an inner member including a wheel hub having an integrally formed wheel mounting flange at one end and a cylindrical portion axially extending from the wheel mount flange and an inner ring fitted on the

cylindrical portion of the wheel hub, double row inner raceway surfaces being formed on the outer circumferential surfaces of the wheel hub and inner ring, respectively, opposite to the double row outer raceway surfaces; double row rolling elements rotatably arranged between the outer and inner raceway surfaces; an encoder mounted on the outer circumferential surface of the inner ring; an annular sensor holder arranged on the end of the outer member opposite to the encoder; a wheel speed detecting sensor integrally molded with the sensor holder and arranged opposite to the encoder via a predetermined radial gap; the encoder has an annular ring configuration and its characteristics alternately and equidistantly vary along its circumferential direction; a seal is arranged at the inboard side of the encoder, the seal including first and second annular sealing plates mounted on the sensor holder and the inner ring, respectively, and opposite toward each other; and the encoder is integrally mounted on the second sealing plate.

2. A wheel bearing apparatus incorporating a wheel speed detecting apparatus of claim 1, wherein the second sealing plate is fitted on the outer circumferential surface of the inner ring and has a substantially "L"-shaped cross-sectional configuration formed by a cylindrical portion with an outer

circumferential surface being integrally mounted with the encoder, a larger cylindrical portion extending axially from the cylindrical portion, and a standing portion extending radially outward from the larger cylindrical portion, and a labyrinth seal being formed at a tip area of the standing portion.

3. A wheel bearing apparatus incorporating a wheel speed detecting apparatus comprising an outer member having an integrally formed body mount flange and double row outer raceway surfaces formed on the inner circumferential surface of the outer member; an inner member including a wheel hub having an integrally formed wheel mounting flange at one end and a cylindrical portion axially extending from the wheel mounting flange and an inner ring fitted on the cylindrical portion of the wheel hub, double row inner raceway surfaces being formed on the outer circumferential surfaces of the wheel hub and inner ring, respectively, opposite to the double row outer raceway surfaces; double row rolling elements rotatably arranged between the outer and inner raceway surfaces; an encoder mounted on the outer circumferential surface of the inner ring; an annular sensor holder arranged on the end of the outer member opposite to the encoder; a sensor of wheel rotation speed integrally molded with the sensor holder and arranged opposite to the

encoder via a predetermined
axial gap; the encoder has an annular plate configuration and its
characteristics alternately and equidistantly vary along its circumferential
direction; a seal is arranged at the inboard side of the encoder via the
sensor holder, the seal including first and second annular sealing plates
mounted on the sensor holder and the inner ring, respectively, and opposite
toward each other.

4. A wheel bearing apparatus incorporating a wheel speed detecting apparatus
according to claim 1, wherein the sensor holder includes an annular fitting
member manufactured from a steel sheet and a holding member, the fitting member
including a cylindrical fitting portion press-fit on the outer circumferential
surface of the outer member, a flange portion extending radially inward from
the fitting portion and adapted to be in close contact on the end surface of
the outer member, and a cylindrical portion extending axially from the flange
portion, and the first sealing plate being fitted in the cylindrical portion.

5. A wheel bearing apparatus incorporating with a wheel speed detecting
apparatus according to claim 1, further comprising a shield having a "C"-shaped
cross-sectional configuration arranged at inboard side of the seal, the shield
forming a labyrinth seal relative to a shoulder of

an outer joint member and
arranging the shield to be opposed to the shoulder via a small radial gap.

6. A wheel bearing apparatus incorporating a wheel speed detecting apparatus
of claim 5, wherein the shield includes a first cylindrical portion adapted to
be fitted in the sensor holder, a standing portion extending radially inward
from the first cylindrical portion and a second cylindrical portion extending
axially from the standing portion, the standing portion forming a labyrinth
seal relative to the second sealing plate and arranging the standing portion to
oppose the sealing plate via a small gap.

7. A wheel bearing apparatus incorporating a wheel speed detecting apparatus
of claim 5, wherein the shield includes a first cylindrical portion adapted to
be fitted in the sensor holder, a standing portion extending radially inward
from the first cylindrical portion and a second cylindrical portion extending
axially from the standing portion, the second cylindrical portion forming a
labyrinth seal relative to the end face of the inner ring and arranging the
second cylindrical portion to be opposed to the end face of the inner ring via
a small gap.

8. A wheel bearing apparatus incorporating a wheel speed detecting apparatus
according to claim 3, wherein the sensor holder

includes an annular fitting member manufactured from a steel sheet and a holding member, the fitting member including a cylindrical fitting portion press-fit on the outer circumferential surface of the outer member, a flange portion extending radially inward from the fitting portion and adapted to be in close contact on the end surface of the outer member, and a cylindrical portion extending axially from the flange portion, and the first sealing plate being fitted in the cylindrical portion.

9. A wheel bearing apparatus incorporating with a wheel speed detecting apparatus according to claim 3, further comprising a shield having a "C"-shaped cross-sectional configuration arranged at inboard side of the seal, the shield forming a labyrinth seal relative to a shoulder of an outer joint member and arranging the shield to be opposed to the shoulder via a small radial gap.

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PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050047691 A1

TITLE: Seal arrangement with **encoder** and magnetization head for the **encoder**

PUBLICATION-DATE: March 3, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Niebling, Peter	Bad Kissingen		DE
Heim, Jens	Schweinfurt		DE
Hofmann, Heinrich	Schweinfurt		DE
Dlugai, Darius	Schweinfurt		DE
Langer, Roland	Schwanfeld		DE

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	COUNTRY	TYPE CODE
FAG Kugelfischer AG				03

APPL-NO: 10/803412

DATE FILED: March 18, 2004

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DE	103 38 960.1	2003DE-103 38 960.1	August 25, 2003

INT-CL-PUBLISHED: [07] **F16C032/00** , **F16C041/04**

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CIPS	G01P3/44	20060101
CIPS	F16C33/76	20060101
CIPS	F16J15/32	20060101
CIPS	G01P3/42	20060101
CIPS	F16C33/78	20060101
CIPS	G01P3/487	20060101

US-CL-PUBLISHED: 384/448

US-CL-CURRENT: **384/448**

REFERENCE-FIGURES: 1

ABSTRACT:

The invention relates to a seal arrangement for sealing off at least one radial interspace between at least one **bearing ring** which can rotate and at least one rotationally fixed **bearing ring**. The seal arrangement is provided with at least a first carrier, the first carrier carrying at least one resilient seal and being fixed to a rotationally fixed **bearing ring**, and a second carrier, the second carrier being fixed to the **bearing ring** that can rotate and carrying at

least one **encoder**. The **encoder** has an outwardly oriented circumferential surface in the shape of a truncated circular cone.

CLAIMS:

What is claimed is:

1. A seal arrangement which seals off at least one radial interspace between a rotatable **bearing ring** and a rotationally fixed **bearing ring**, the seal arrangement comprising: a first carrier, the first carrier carrying a resilient seal and being fixed to said rotationally fixed **bearing ring**; a second carrier, the second carrier being fixed to the rotatable **bearing ring** and carrying an **encoder, the encoder** having an outwardly oriented circumferential surface which defines a truncated circular cone; and a dirt deflector, the dirt deflector and the first carrier being arranged such that they can rotate relative to each other such that the seal bears at least on the dirt deflector, the **encoder** being arranged outside the interspace and around the rotatable **bearing ring**.

2. The seal arrangement as claimed in claim 1, further comprising a covering element, the **encoder** being covered radially and axially by the covering element, the covering element being fixed to one of the **bearing rings**.

3. The seal arrangement as claimed in claim 2, in which the covering element
at least partly covers the seal.

4. The seal arrangement as claimed in claim 2, in which the covering element
is formed in one piece with the first carrier.

5. The seal arrangement as claimed in claim 2, in which the covering element
is fixed to a radially outer surface section of the rotationally fixed **bearing ring**.

6. The seal arrangement as claimed in either one of claims 4 and 5, in which
the covering element, starting from the rotationally fixed **bearing ring,**
initially extends axially away from the rotationally fixed **bearing ring,** for
being radially disposed between a **sensor and the encoder,** and covers the
encoder in the radial direction; the covering element then extends radially
and at least partly covers the **encoder** and the interspace in the axial
direction; and the covering element finally extends axially in the direction
toward the interspace while carrying the seal.

7. The seal arrangement as claimed in either one of claims 4 and 5, in which
the covering element, starting from the rotationally fixed **bearing ring,**
initially extends axially away from the rotationally fixed **bearing ring,** for

being radially disposed between a **sensor and the encoder,** and covers the **encoder** in the radial direction; the covering element then extends radially and at least partly covers the **encoder** and the interspace in the axial direction; the covering element then runs in the direction toward the interspace radially between the **encoder** and the rotatable **bearing ring**; and the covering element finally extends radially in the direction toward the rotatable the **bearing ring** while carrying the seal.

8. The seal arrangement as claimed in claim 1, wherein the dirt deflector and the second carrier are formed in one piece.

9. The seal arrangement as claimed in claimed 2, in which the second carrier initially extends from the dirt deflector and, arranged radially between the seal and the rotatable **bearing ring,** extends axially in the direction toward the interspace; then extends radially between the interspace and the seal; runs radially away from the rotatable **bearing ring**; and finally runs axially in the direction toward the covering element while supporting the **encoder**.

10. The seal arrangement as claimed in claim 1, in which the seal bears on the dirt deflector in the axial direction with at least one sealing lip.

11. The seal arrangement as claimed in claim 1, in

which the seal bears
radially on the dirt deflector with at least one sealing lip.

12. The seal arrangement as claimed in claim 1, in which the seal bears
directly on the rotable **bearing ring** with at least one sealing lip.

13. The seal arrangement as claimed in claim 1, in which the seal bears
radially on the second carrier with at least one sealing lip.

14. The seal arrangement as claimed in claim 1, in which the seal and the dirt
deflector enclose between them an annular hollow space filled with a
lubricating grease.

15. The seal arrangement as claimed in claim 1, in which the dirt deflector is
a **ring** with an angled cross section having two limbs disposed at right angles
to each other, the **encoder** engaging radially around at least one of the limbs.

16. The seal arrangement as claimed in claim 1, in which the second carrier is
a **ring** with two hollow cylindrical sections that face away from each other, the
sections being connected to each other by a web which is disk-like and extends
radially away from the rotatable **bearing ring**; wherein one of the sections
accommodates the **encoder** radially and the other of the sections is seated on

the rotatable **bearing ring**.

17. The seal arrangement as claimed in claim 1, in which the **encoder** is formed from a resilient material.

18. The seal arrangement as claimed in claim 1, further comprising a magnetization head for polarizing said **encoder**, in which the magnetization head has on its inner circumference an inner circumferential surface defining an inner cone, the inner circumferential surface corresponding with the circumferential surface of the truncated cone of the **encoder**; the rectilinear inner circumferential lines of the inner circumferential surface describing the inner cone being inclined with respect to the axis of rotation of the magnetization head, and being longer than the circumferential lines oriented in the same direction as the inner circumferential lines and describing the circumferential surface of the **encoder**.

19. The seal arrangement as claimed in claim 18, in which the smallest inner cone diameter of the inner cone is smaller than the smallest external diameter of the truncated circular cone, and in which the inner circumferential surface of the magnetization head, which is seated on the **encoder** during polarization and bears on the circumferential surface, projects axially beyond the circumferential surface of the **encoder** on both

sides.

20. The seal arrangement as claimed in claim 2, wherein said first and second carriers, said dirt deflector and said covering element are interconnected to form a cartridge.

21. A magnetization head for polarizing an **encoder** having an outwardly oriented circumferential surface which defines a truncated circular cone, in which the magnetization head has on its inner circumference an inner circumferential surface defining an inner cone, the inner circumferential surface corresponding with the circumferential surface of the truncated cone of the **encoder**; the rectilinear inner circumferential lines of the inner circumferential surface describing the inner cone being inclined with respect to the axis of rotation of the magnetization head, and being longer than the circumferential lines oriented in the same direction as the inner circumferential lines and describing the circumferential surface of the **encoder**.

22. The magnetization head as claimed in claim 21, in which the smallest inner cone diameter of the inner cone is smaller than the smallest external diameter of the truncated circular cone, and in which the inner circumferential surface of the magnetization head, which is seated on the

encoder during polarization
and bears on the circumferential surface, projects axially beyond the
circumferential surface of the **encoder** on both sides.

23. The magnetization head as claimed in claim 21, further comprising an
encoder having an outwardly oriented
circumferential surface which defines a
truncated circular cone, said **encoder** being engaged with said magnetization
head.

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ABSTRACT:

To avoid an adherence of metallic particles from a knuckle to a magnetic **encoder** during coupling of a wheel support **bearing** assembly to the knuckle and/or transportation of the wheel support **bearing** assembly, a protective **cap** (18) is provided. The wheel support **bearing** assembly with which the protective **cap** (18) can be used is of a type including a magnetic **encoder** (10) provided in a sealing unit (5). This protective **cap** (18) includes an annular cover-up portion (18a) for enclosing an annular surface of the magnetic **encoder** (10) that is exposed bare to the outside, and an engagement wall (18b). The engagement wall (18b) is integral with the annular cover-up portion (18a) and of a cylindrical shape capable of being removably

engaged in the wheel support
bearing assembly.

CLAIMS:

What is claimed is:

1. A protective **cap** for use in association with a wheel support **bearing**
assembly which includes an outer member having an inner peripheral surface
formed with raceways, an inner member having an outer peripheral surface formed
with raceways in alignment with the raceways in the outer member, rows of
rolling elements operatively interposed between the raceways in the outer
member and the raceways in the inner member, sealing units for sealing
respective open ends of an annular working space delimited between the inner
and outer members, and a magnetic **encoder** provided in one of the sealing units
and having an annular surface exposed bare to a radial face of the wheel
support **bearing** assembly, the magnetic **encoder** having a plurality of
alternating magnetic poles arranged in a direction circumferentially thereof,
said protective **cap** comprising: an annular cover-up portion for enclosing the
annular surface of the magnetic **encoder** that is exposed bare to the radial
surface of the wheel support **bearing** assembly, and an engagement wall integral
with the annular cover-up portion and capable of

being removably engaged in the wheel support **bearing** assembly, whereby the protective **cap** is removably mounted on the wheel support **bearing** assembly.

2. The protective **cap** as claimed in claim 1, wherein the engagement wall is removably engaged with one end of an axial bore of the inner member.

3. The protective **cap** as claimed in claim 1, wherein the engagement wall is of a cylindrical shape.

4. The protective **cap** as claimed in claim 1, wherein further comprising a center cover-up portion for covering a center portion of an end face of the wheel support **bearing** assembly.

5. The protective **cap** as claimed in claim 1, wherein the protective **cap is of a ring** shape and wherein the engagement wall is removably inserted in a gap delimited between an outer periphery of the **encoder** and the sealing unit.

6. The protective **cap** as claimed in claim 1, wherein the inner member of the wheel support **bearing** assembly includes an inner **race** and a hub wheel engageable with an inner peripheral surface of the inner **race,** and wherein the engagement wall is removably engageable with one end of an inner peripheral surface of the hub wheel.